

REMARKS

Claims 1, 3-10 and 12-20 are presently pending; claims 1 and 10 have been amended to incorporate the subject matter of claims 2 and 11, respectively; as well as additional features; claims 2 and 11 have been cancelled accordingly; and new claims 15-20 have been added. Support for the amendments to claims 1 and 10 can be found, *inter alia*, in Figures 1 and 2, and in the present specification at page 9, first paragraph and page 13, first paragraph. Support of new claims 15-20 can be found, *inter alia*, at page 9, first paragraph. No new matter has been added.

Asaumi

Claims 1 and 3-4 are rejected under 35 U.S.C. § 102(b) as being anticipated by Asaumi (JP No. 60059063); claim 2 is rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Asaumi (JP No. 60059063).

The Office Action asserts that Asaumi discloses each feature of instant claims 1 and 3-4. With respect to claim 2, the Office Action asserts that Asaumi further discloses forming a target between the desired material [7] and metallic material [8] (Abstract) to form a mixed (i.e., composite film). It is thus allegedly either inherent, or would have been obvious, that since the target is formed of two distinct components, the targets can be split into two distinct targets.

Applicants traverse the rejections; amend claims 1 and 10 to incorporate the subject matter of claims 2 and 11, respectively; as well as additional features; and add new claims 15 - 20.

Instant amended claim 1 recites “metal portions composed of a first metal component and metal compound portions composed of a compound of a second metal component different from

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said first metal component...” and “and simultaneously and independently applying electric powers to said targets to perform sputtering.” Thus, the composite thin film of instant claim 1 includes metal portions containing a first metal component and metal compound portions containing a second metal component. The second metal component of claim 1 is a component of the metal compound portion. The claimed method involves electric powers being *simultaneously and independently* applied to the metal target containing the first metal component and the metal composition target containing the second metal target.

In contrast, Asaumi (JP No. 60059063) discloses a porous thin film of a desired material 7 and a metallic material 8. However, Asaumi nowhere discloses what its desired material is, nor electric powers as being simultaneously and independently applied to a metal target containing a first metal component, and a metal composition target containing a second metal target. Neither the claimed configuration recited in claim 1, nor the advantages thereof, e.g., improved material distribution (see page 9, first paragraph), would have been obvious over Asaumi. Applicants also respectfully submit that the Office Action mischaracterizes Asaumi with respect to claims 3 and 4. For example, the Office Action asserts that Asaumi discloses alumina as used as cathode material; and that alumina is used as cathode material with platinum. However, as indicated in the corresponding section of the cited Japanese reference, Asaumi only discloses the *anodic* oxidation of aluminum for making a porous alumina. Asaumi discloses neither a sputtering target of alumina, nor alumina as the desired material. Further, Asaumi describes platinum as an example of a *removable* metal material. Accordingly, platinum is not the second metal in claim 1 (the second metal of claim 1 is a component of the metal compound portion); and platinum is neither the first metal nor the second metal in claim 4.

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In view of the foregoing, Asaumi nowhere discloses, nor would Asaumi have rendered obvious, the features of any of claims 1 and 3-4. Reconsideration and withdrawal of the rejections are earnestly solicited.

Yamamoto

Claims 10 and 12-14 are rejected under 35 U.S.C. § 102(b) as being anticipated by Yamamoto (JP No. 1123067); claim 11 is rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Yamamoto (JP No. 1123067).

The Office Action takes the position that Yamamoto discloses each feature of claims 10 and 12-14. With respect to claim 11, the Office Action alleges that Yamamoto further discloses forming a target of Al grains and Pt grains to form a mixed target, which is then sputtered onto the substrate to form a mixed (i.e., composite) film (Abstract). It would allegedly thus either inherent or obvious that since the target is formed of two distinct components, the targets can be split into two distinct targets.

Applicants traverse the rejections; amend claims 1 and 10 to incorporate the subject matter of claims 2 and 11, respectively, as well as additional features; and add new claims 15 and 20.

Instant amended claim 10, from which claims 12-14 depend, recites “wherein said composite thin film is formed by arranging a first metal target composed of said first metal component and a second metal target composed of said second metal component different from said first metal component in a chamber, and simultaneously and independently applying electric powers to said targets to perform sputtering.” This method makes it possible to produce a composite having fine first metal portions composed of a first metal component, and fine second metal compound portions composed of a compound of a second metal component (or fine second

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metal portions composed of a second metal component) that are extremely well distributed. As disclosed (see page 9, first paragraph), when the substrate is rotated, for example, distribution (of the first metal portions and the second metal compound portions or second metal portions) in the direction of the plane of the composite thin film can be controlled for uniformity. It is also possible to change the ratio of the first metal portions to the second metal compound portions or second metal portions, by altering the electric powers to be applied to the respective targets.

In contrast, although Yamamoto (JP No. 1123067) discloses a thin porous film made by sputtering a mixture of Al (an auxiliary material) and Pt, and removing the auxiliary material, Yamamoto only discloses a target consisting of a mixture of Al grains and Pt grains. Yamamoto nowhere discloses independent targets as consisting of Al and Pt, respectively. Accordingly, Yamamoto also does not disclose, for example, the advantages of rotating the substrate, which would be more applicable to configurations such as that claimed.

In view of the foregoing, Yamamoto nowhere discloses, nor would Yamamoto have rendered obvious, the features of any of claims 10 and 12-14. Reconsideration and withdrawal of the rejections are earnestly solicited.

Claim Rejection under 35 U.S.C. § 103

Claims 5-6 and 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Asaumi (JP No. 60059063) as applied to claim 1 above, and further in view of Tomita (U.S. Patent No. 5,256,443); claims 7-8 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Asaumi (JP No. 60059063) as applied to claim 1 above, and further in view of Yamamoto (JP No. 1123067).

With respect to both rejections, Asaumi is applied as to claim 1, from which claims 5-9 variously depend. However, the Office Action concedes that Asaumi does not suggest that the

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second metal is comprised of titanium; and that Asaumi is limited in that, while a plasma-etch is used to remove the metallic material, it is not suggested to remove the metal portions via aqueous solution.

Nonetheless, Tomita allegedly further teaches having a multi-component noble metal on a substrate where metals such as Al (aluminum) or Ti (titanium) are used (column 1, lines 58-63), and platinum is used as the noble metal on the substrate (column 3, lines 45-47). Tomita cites the advantage of using these components as producing multi-component porous thin film where the crystalline and amorphous structure or the compactness of said porous thin film is easily controlled (column 5, lines 58-68; and column 6, lines 1-6). It would thus allegedly have been obvious to use titanium as a metal material taught in Tomita as a component in the mixed film of Asaumi to gain the advantages of easier control of crystalline and amorphous structure and compactness.

The Office Action takes the position that Yamamoto discloses forming a thin porous film where said film comprises an auxiliary material (i.e., metal portions) with a film material from a sputter target, where the auxiliary material is aluminum (Al) and the film material is platinum (Pt) (Abstract). Yamamoto further discloses immersing in an alkali or acidic liquor (i.e., aqueous solution) to remove the Al (Abstract). Thus, since both Asaumi and Yamamoto disclose sputtering materials to create a porous thin film and then removing one component of the sputtered material, it would allegedly have been obvious to substitute the plasma-etch for acidic or alkali liquor to achieve the predictable result of the removal of the specific material.

Applicants traverse the rejections; amend claims 1 and 10 to incorporate the subject matter of claims 2 and 11, respectively, as well as additional features; and add new claims 15 and 20.

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Tomita (U.S. Patent No. 5,256,443) discloses a sputtering method for making a thin film in the Related Art section. However, Tomita describes the disadvantages of the sputtering method; and does not itself employ a sputtering method. Tomita discloses a manufacturing method of a noble metal film or a noble metal oxide film by using noble metal alkoxides or noble metal alkoxides and noble metal oxides. In Tomita's alkoxide method, precursors of both of the noble metal film and a noble metal oxide film are oxides and/or hydroxides. The precursor of the oxides and/or hydroxides is reduced to noble metals or oxidized to oxides. Tomita does not disclose a composite film of metal portions (containing a first metal component) and metal compound portions (containing a second metal component). Accordingly, there would have been no motivation to employ the metal component disclosed on Tomita, in the sputtering method of Asaumi.

Yamamoto is described above with respect to claims 10 and 13-14. Likewise, and for at least the reasons cited with respect to the claimed feature "and simultaneously and independently applying electric powers to said targets to perform sputtering," Yamamoto does not remedy the deficiencies of Asaumi with respect to amended claim 1.

In view of the foregoing, neither of Tomita or Yamamoto remedies the deficiencies of Asaumi with respect to amended claim 1, from which claims 5-9 variously depend. Accordingly, no combination of Tomita, Asaumi or Yamamoto would have rendered obvious the features of any of claims 5-9.

Due at least to their dependency on allowable claims 1 and 10, all of new claims 15-20 are also allowable.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

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Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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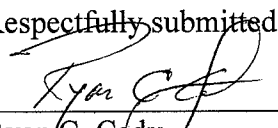
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Respectfully submitted,



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